

ORIGINAL

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

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In the Matter of

Policies and Rules for the Direct
Broadcast Satellite Service

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

IB Docket 98-21

REPLY COMMENTS OF NORTHPOINT TECHNOLOGY

Northpoint Technology ("Northpoint"), by its attorneys, hereby files its reply comments on the Notice of Proposed Rulemaking ("NPRM") in the above-captioned proceeding.¹

Northpoint has developed an exciting, innovative technology that would permit Direct Broadcast Satellite ("DBS") licensees to deliver local television signals to their customers for the first time. Northpoint's reply, however, focuses on the comments filed by SkyBridge L.L.C. ("SkyBridge"), specifically regarding SkyBridge's ability to share the DBS spectrum band. Given the vast importance of local television signal distribution to DBS providers' ability to compete with cable television services, the Commission should not facilitate the offering of SkyBridge's speculative new service absent evidence that such use will allow deployment of Northpoint's innovative technology, while ensuring the continued availability of DBS service to American consumers.

SkyBridge has proposed a satellite system offering broadband data services targeted at infrastructure-poor countries around the world, using among other spectrum, 1.05 GHz in the

¹ Policies and Rules for the Direct Broadcast Satellite Service, Notice of Proposed Rulemaking, FCC 98-26 (Feb. 26, 1998) ("NPRM").

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10.7-12.75 GHz band.² SkyBridge's ability to share spectrum with geosynchronous satellite systems, such as DBS, is premised on switching on and off a large constellation of low earth orbit satellites with a high degree of precision and the use of low angles of arrival for its space-to-Earth service links. Thus far, SkyBridge has not demonstrated that this type of operation would adequately protect existing DBS systems from harmful interference. Understandably, DBS providers have strongly questioned whether the proposed system will, in fact, be compatible with continued use of the 12.2-12.7 GHz band for DBS – a popular consumer service that is enjoyed by 8 million Americans, and growing.³

In its comments, SkyBridge asks the Commission to modify the DBS rules to allow implementation of its proposed system, seemingly ignoring the serious spectrum sharing and interference issues that have not been satisfactorily addressed.⁴ Indeed, the mere fact that SkyBridge is requesting numerous changes in the DBS rules indicates that significant geostationary/nongeostationary satellite spectrum sharing and interference issues remain.

Moreover, even if SkyBridge can protect geostationary services, the system is not designed to afford adequate protection to terrestrial services, where receive antennas are generally directed at or around the horizon. Northpoint's proposal, for example, would effectively be precluded by SkyBridge's operation in this band at the interim power flux density

² See Application of SkyBridge for Authority to Launch and Operate the SkyBridge System, File No. 48-SAT-P/LA-97, February 28, 1997 (the "SkyBridge Application"), Amendment, File No. 89-SAT-AMEND-97, July 3, 1997 (the "SkyBridge Amendment").

³ See, e.g., Joint Petition to Defer Action Pending Submission of Further Information of the Satellite Coalition, File Nos. 48-SAT-P/LA-97, 89-SAT-AMEND-97 (filed Dec. 15, 1997).

⁴ SkyBridge Comments at 3-6.

limits adopted at WRC 97.⁵ While Northpoint's terrestrial wireless system can co-exist with DBS in the 12.2-12.7 GHz band, providing the full panoply of local broadcast signals as well as other data services to DBS subscribers, the system operates at power levels far lower than the point-to-point microwave links used as the model for terrestrial services at WRC 97. As discussed in Northpoint's pending Petition for Rulemaking, its technology promises finally to permit DBS providers to compete fully with cable operators,⁶ with potential savings to American consumers of over \$3 billion annually;⁷ to increase the programming options available to consumers; and to fulfill Commission and Congressional policies promoting localism and public service.⁸ Yet, the public could be denied all of these benefits and more if SkyBridge is authorized to operate in the 12.2-12.7 GHz band.

The 8 million American consumers who currently enjoy DBS services in their homes have already invested approximately \$3 billion in DBS equipment. As evidenced by Northpoint's Petition, technology exists for making this initial investment even more valuable. Given the very popular consumer services already offered in the 12.2-12.7 GHz band -- and the

⁵ See Northpoint, Petition for Rulemaking to Modify Section 101.147(p) of the Commission's Rules To Authorize Subsidiary Terrestrial Use of the 12.2-12.7 GHz Band By Digital Broadcast Satellite Licensees and Their Affiliates, filed March 6, 1998 [attached hereto as Exhibit I].

⁶ The current inability of DBS licensees to compete head-to-head with cable television providers has been largely attributed to the unavailability of local television signals on national DBS systems. See, e.g., *Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming*, CS Dkt. No. 97-141, Fourth Annual Report ("1997 Report") (1998) at ¶¶ 54 *et seq.*

⁷ See Petition at 8.

⁸ Significantly, as detailed in Northpoint's Petition, this exciting technology could be promptly deployed with only a minor rule modification.

potential enhancements that could be available through Northpoint's technology -- it is simply not in the public interest for the Commission to modify its rules to facilitate SkyBridge's use of this band absent proof that no harmful interference will occur. Should SkyBridge's calculations be incorrect, as some have suggested, the system could entirely eradicate what the Commission has called the "most significant alternative to cable television."⁹ At a minimum, the system will interfere with Northpoint's proposed enhancements to DBS. As such, authorizing SkyBridge in the 12.2-12.7 GHz band clearly would not serve the public interest.

As a final matter, to the extent that the SkyBridge comments attempt to justify its proposal on the basis of spectrum efficiency,¹⁰ the efficiency gains of re-using the 12.2-12.7 GHz band for a low earth orbit satellite underlay are far, far less than the efficiencies available through re-use of the band on a local, terrestrial basis, such as Northpoint proposes. In fact, Northpoint estimates that it would be able to re-use the 12.2-12.7 GHz band to provide unique and different local programming in each of the 211 designated U.S. market areas for broadcast services effectively reusing the spectrum 211 times. In addition, through the use of directionalized signals on a terrestrial basis (*e.g.*, transmitters operating at 135° and 225°), additional frequency re-use may also be possible.

Northpoint reiterates its objection to SkyBridge's operation in the 12.2-12.7 GHz band. The Commission should not put at risk the popular consumer services already operating in the band, nor preclude the deployment of innovative technologies in this spectrum, such as that

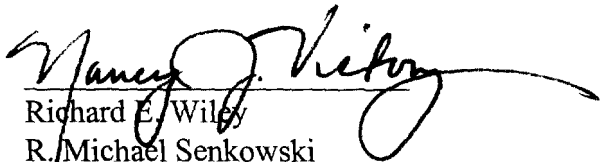
⁹ 1997 Report at 6.

¹⁰ SkyBridge Comments at 4-6.

proposed by Northpoint, that can further enhance existing DBS services and promote competition to the benefit of all Americans.

Respectfully submitted,

NORTHPOINT TECHNOLOGY

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April 21, 1998

DUPLICATE

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of:)
)
NORTHPOINT TECHNOLOGY) RM No. _____
)
Petition for Rule Making To Modify Section)
101.147(p) of the Commission's Rules To)
Authorize Subsidiary Terrestrial Use of the)
12.2-12.7 GHz Band By Digital Broadcast)
Satellite Licensees and Their Affiliates)

To: The Commission

PETITION FOR RULE MAKING

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March 6, 1998

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12.2-12.7 GHz Band By Digital Broadcast)
Satellite Licensees and Their Affiliates)

To: The Commission

PETITION FOR RULE MAKING

Northpoint Technology ("Northpoint"), by its attorneys, hereby petitions the Federal Communications Commission to initiate a rule making to modify Section 101.147(p) of its rules to allow Direct Broadcast Satellite ("DBS") licensees and their affiliates to obtain secondary, subsidiary communications authorizations for terrestrial use of the 12.2-12.7 GHz band. As discussed herein, Northpoint has developed an innovative plan that would jumpstart competition in the multichannel video program distribution marketplace by allowing terrestrial DBS affiliates to re-use the DBS band in order to distribute local television signals and deliver broadband digital data to American consumers. Northpoint's unique approach to terrestrial use of the band will enable a broad range of new services by efficiently "re-harvesting" existing spectrum resources without any harmful interference to existing services. Accordingly, Northpoint urges the FCC promptly to initiate a rule making bringing the benefits of this technology to the American public.

I. SUMMARY

In its recent report to Congress on the multichannel video program distribution market, the Commission bemoaned the current state of competition. Noting cable television's overwhelmingly dominant position in the market despite rapidly rising rates and widespread customer dissatisfaction, the Commission's report identified DBS services as the most significant alternative to cable. Yet, the report also recognized that the current inability of DBS to carry local broadcast signals is the single most important impediment to DBS' ability to compete effectively with cable for customers.

Northpoint has developed an exciting, innovative solution that can quickly and simply remove this impediment to competition in the multichannel video program distribution marketplace. Northpoint's technology is an advanced digital wireless system that would allow DBS and terrestrial broadcasters to co-exist within the 12.2-12.7 GHz band – doubling the available capacity of the DBS spectrum and enabling DBS services, such as DirecTV, to provide local television channels and high-speed terrestrial-based wireless Internet service. Tests conducted under a FCC experimental license in October 1997 demonstrate how Northpoint's technology can provide local television signals without interference to existing services.

By enabling the carriage of all full power and qualified low power television stations, Northpoint's technology would finally level the playing field for DBS to compete against cable operators, with resulting lower rates and increased program variety for consumers nationwide. The system's effect of increasing consumers' ability to access local programming would also promote localism and address community needs. Additionally, by expanding the capacity of DBS systems, Northpoint's proposal would finally enable DBS providers to meet certain

Congressionally-mandated, noncommercial programming requirements. The technology would also permit the offering of a wide range of broadband data services and provide a model for spectrum sharing in other frequency bands.

Significantly, only minimal rule changes are required to bring the benefits of Northpoint's technology to the public. As described herein, simple modifications to an existing provision of Part 101 of the Commission's Rules would permit DBS licensees, and third party systems integrators affiliated with DBS systems, to obtain secondary, shared authorizations to deploy terrestrial facilities for the provision of a complete menu of local television programming and other adjunct data services in the 12.2-12.7 GHz band. Northpoint urges the FCC to act expeditiously to allow deployment of this technology in order to spur competition in the multichannel video program distribution market and bring the vast benefits of DBS/terrestrial sharing to the American public.

II. OVERVIEW OF THE NORTHPOINT SYSTEM

At present, 8 million Americans subscribe to Digital Broadcast Satellite ("DBS") services to receive multichannel video programming. DBS utilizes a digital satellite signal that can be received by a small consumer dish antenna, decoded by a receiver, and converted into multiple channels of high quality video programming. Because the system is digital, picture quality is typically very good, sound is of compact disk quality, and compression techniques can be used to provide a wide selection of programming. Due to the multiplicity of local over-the-air television stations within the vast areas served by DBS satellites, however, DBS systems do not have the bandwidth capacity to carry all local TV signals in all local markets. For this reason, and despite

the fact that DBS subscription rates are quite reasonable. DBS has not been able to compete fully with cable television systems.

Northpoint's patented and patent-pending technology was developed in an effort to solve the DBS "local signal" problem. Northpoint recognized that existing consumer DBS antennas are able to discriminate between signals emanating from different satellite orbital "slots" over the equator separated by only 9 degrees.¹ Northpoint was able to develop technology that, in effect, creates a terrestrial orbital slot whereby DBS spectrum can be re-used in different local markets without harmful interference to existing DBS services. This basic technology can not only be used to provide local television signals, but also be employed to deliver high-speed Internet services within the DBS band and terrestrial digital services in any spectrum allocated for geosynchronous satellite systems.

Conceptually, Northpoint's technology utilizes the generally southerly orientation of domestic DBS dishes to avoid interference with conventional DBS services. By using directional terrestrial transmitters pointed south, Northpoint's signals arrive at the "back" of standard consumer DBS dishes and are not received or noticed by the subscriber as interference to the existing DBS video programming. With the addition of a second dish pointed north, however, the subscriber would be able to receive the wholly different Northpoint transmission. Because Northpoint's technology operates in the same band, and uses the same digital encoding, as conventional DBS, the second Northpoint end-user antenna can be connected to the existing

¹ These existing DBS systems are able to co-exist without mutually harmful interference because end-user DBS satellite receivers are directional and can be oriented to a signal emanating from a specific orbital slot while suppressing signals from other orbital slots. In some cases (*e.g.*, coastal users), the inability to "see" some orbital slots also aids in mitigating harmful interference.

DBS receiver and the local programming can be decoded. Thus, Northpoint's technology is the *only* system for local television signal distribution that can provide access to *all* qualified local stations in every market while preserving DBS subscribers' existing equipment investment.

Northpoint envisions its technology being deployed cooperatively by DBS providers, systems integrators, and local broadcasters with licensees being granted secondary, subsidiary shared authorizations subject to specific non-interference conditions. As a condition of licensing, the system integrator licensee would also be subject to "must carry" rules and retransmission consent requirements for carriage of local television broadcast signals. Notably, even carrying the full complement of locally-available television signals in *both* currently used DBS digital formats, Northpoint's system still would have significant excess capacity that could be used to deliver a range of broadband data offerings.

III. NORTHPOINT'S TECHNOLOGY WILL FURTHER CRITICAL PUBLIC INTEREST POLICIES

FCC action to permit the deployment of Northpoint's technology would clearly serve the public interest by furthering important FCC and Congressional goals. Most significantly, Northpoint's technology would remove a major barrier to full and fair competition in the multichannel video program distribution marketplace, with resulting benefits to consumers in terms of lower rates and greater program variety. Deployment of this technology would also promote localism and address community needs by increasing the availability of local programming. Northpoint's proposal additionally would expand the capacity of DBS systems to enable DBS providers to meet Congressionally-required, noncommercial programming

requirements. Finally, this technology would provide additional opportunities for spectrum efficiency and support critical data transmission needs.

A. Northpoint's Technology Will Enable DBS Providers To Compete More Effectively Against Cable Television Systems

In its recently released annual report to Congress, the FCC evaluated the state of competition in the multichannel video program distribution ("MVPD") market. The report noted that "the cable industry continues to occupy the dominant position in the MVPD marketplace," with "87% of MVPD subscribers receiv[ing] service from their local franchised cable operator."² Based upon these statistics, the FCC concluded that "[l]ocal markets for the delivery of video programming generally remain highly concentrated and are still characterized by some barriers to both entry and expansion by competing distributors."³ Notwithstanding that only 45 percent of cable television subscribers report being satisfied with their service, "a Commission survey of cable industry prices indicates that the average monthly rate for programming services offered on basic and cable programming service . . . tiers and equipment charges increased from \$26.57 on July 1, 1996, to \$28.83 on July 1, 1997, an increase of 8.5%."⁴ Due to the seemingly unchecked rise in cable rates, the report also notes that the "Consumers Union and Consumers Federation of

² *Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming*, CS Dkt. No. 97-141, Fourth Annual Report (1997 Report) (1998) at ¶ 87.

³ *Id.* at 6.

⁴ *Id.* at 7. *See also id.* at ¶ 87 (noting that, "[a]ccording to a Nielsen Media Research survey, on a scale of one to five (with five being the most satisfied), 80% of DBS subscribers rate overall satisfaction with their satellite service as a four or a five. By comparison, 45% of cable subscribers rate overall satisfaction with their cable service as a four or a five."); "Paying the

(Continued...)

America filed a petition asking the Commission to freeze current rates for all regulated cable services while it investigates why rates are increasing so rapidly and considers changes to its cable rate regulation formula.”⁵

The Commission’s report also evaluated the role of DBS in the MVPD market, noting that “DBS service is widely available and constitutes the most significant alternative to cable television.” The report found, however, that “[i]mpediments to carriage of local broadcast signals by DBS services reduce the satellite services’ ability to compete effectively with cable television.”⁶ The Commission noted that one of consumers’ major concerns about the purchase and use of a DBS system was the inability to receive local channels, citing a consumer survey that reported, of those consumers that had recently shopped for a digital satellite system, “87% of those surveyed cited the inability to receive local stations as major reason for not buying a DBS system.”⁷ The universe of potential DBS subscribers thus appears limited to: (i) those in rural areas without any local broadcasts to receive; (ii) those with the ability to receive good signal quality over-the-air broadcasts from the full range of desired local stations and with the technical capability to integrate DBS and over-the-air signals into their televisions; (iii) those able to afford *both* cable and DBS; and, (iv) those willing to forego the benefits of local

(...Continued)

Price for Cable TV,” *The Washington Post*, February 21, 1998, pp. H1, H2 (“cable prices are bounding upward at triple the general inflation rate”).

⁵ *Id.*

⁶ Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming, CS Dkt. No. 97-141, Fourth Annual Report (1997 Report) (1998) at ¶ 57.

⁷ *Id.* at ¶ 57.

broadcasting. Comparatively speaking, Northpoint believes, DBS is currently competing for only a small percentage of the overall video delivery market.

The competitive consequences of the lack of local signal delivery has immediate and substantial financial ramifications for the American public. Indeed, if its technology were deployed immediately to make DBS fully competitive with cable, Northpoint believes American consumers would save over \$3 billion dollars annually. As an initial matter, assuming that 60 percent of DBS subscribers use basic cable services to obtain local signals at an average price of \$28.83 per month⁸ and that these consumers could obtain local signals through Northpoint's technology at an average of \$7 per month,⁹ current potential savings from Northpoint's system would amount to \$1.26 billion annually for existing DBS subscribers. Even more important, however, is the effect of this technology in enabling a real competitor to cable television. In order to compete with DBS, cable operators will undoubtedly reduce prices for all consumers. Simply rolling back last year's 8.5 percent average cable price hike would result in a \$1.74 billion dollar dividend for the 64.2 million American families who use cable services.¹⁰

⁸ Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming, CS Dkt. No. 97-141, Fourth Annual Report (1997 Report) (1998) at 7.

⁹ Northpoint believes that \$7 per month for local television signals using its technology is a high estimate. Under some economic scenarios, Northpoint believes it may financially viable to offer such services for less than half that cost.

¹⁰ Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming, CS Dkt. No. 97-141, Fourth Annual Report (1997 Report) (1998) at 6-7.

B. Northpoint's Technology Will Add Value to DBS And Promote Localism By Curing the Local Television Signal Problem

The DBS system was designed and implemented using geosynchronous satellites to cover all, or vast portions of, the continental United States. Thus, the DBS satellite “feed” received by a Washington, D.C. DBS customer is identical to the feed received by a subscriber in Chicago, Illinois. Without the capability to vary the content of the DBS channels on a city-by-city basis, DBS simply cannot provide every local subscriber with access to that subscriber’s locally available over-the-air programming. To do so would require DBS providers to carry every one of the over 1500 high power television stations and certain qualifying stations among the 2033 low power television stations in the United States. With each DBS provider having access to 500 channels or less, and given the competitive need to carry a substantial number of non-broadcast programming (*e.g.*, premium movie channels, MTV), DBS providers have had to resort to carrying only a few of the many affiliates of each of the major networks.

The value of locally-originated programming responsive to community needs cannot be understated. Local programming originating from Seattle—or even New York City—does not enable communities outside of those cities to access local news, weather and other information pertinent to their local needs and interests. Similarly, as the FCC has recognized in the past, locally-originated programming strengthens communities by connecting individuals with cultural events, local politics, and other community-oriented “hot” topics. The rich diversity of commercial and non-commercial stations in the United States, in fact, attests to the value of localism. For example, in cities with a high non-English speaking population, local television stations may broadcast in a foreign language all or part of the time, serving a critical role by fulfilling cultural needs, providing information to engage citizens in the community who might

otherwise be unaware of vital health, safety, political or other issues, and providing needed entertainment, and targeted advertising, to valuable subsets of the population.

C. Northpoint's Technology Will Provide DBS Providers a Method to Deliver Noncommercial Broadcasting Services

With the passage of the 1992 Cable Act, Congress added a new Section 335 to the Communications Act which directed the Commission to initiate a rule making to impose public interest or other requirements for providing video programming on DBS service providers.¹¹ Section 335(a) states, among other things, that any regulations shall, at a minimum, apply the political broadcasting rules of the Communications Act to DBS providers, including the access to broadcast time requirement of Section 312(a)(7) and the use of facilities requirements of Section 315. This section also requires the Commission to examine the opportunities that the establishment of DBS service provides for the principle of localism and permits the Commission to impose additional public interest obligations on DBS providers if they are warranted. Section 335(b) mandates that DBS providers reserve between 4 percent and 7 percent of their channel capacity exclusively for noncommercial programming of an educational or informational nature.

The Commission launched a proceeding in 1993 on this issue,¹² and recently has issued a public notice seeking to update and refresh the record in this proceeding.¹³ The main stumbling

¹¹ Section 335 was added to the Communications Act by Section 25 of the 1992 Cable Act. U.S.C. § 335.

¹² *Implementation of Section 25 of the Cable Television Consumer Protection and Competition Act of 1992, Direct Broadcast Satellite Service Obligations*, MM Dkt. No. 93-25, Notice of Proposed Rulemaking (*Public Service Obligations NPRM*), 8 FCC Rcd 1589 (1993).

¹³ *Implementation of Section 25 of the Cable Television Consumer Protection and Competition*
(Continued...)

block to implementation of this Congressional mandate has been the lack of available channel space for DBS providers to provide such localized, public-oriented broadcasting. Northpoint's technology will provide an extraordinary source of new capacity for DBS providers, enabling them to meet these Congressionally-required, publicly beneficial, noncommercial programming requirements.

D. Northpoint's Technology Will Enable A Wide Range of Needed New Broadband Data Capabilities

As the Commission's *1997 Report* indicates, cable television systems are increasingly offering consumers the ability to obtain Internet and other broadband data services using the cable television plant. Obviously, any competitor, including DBS, will have to offer similar capabilities to remain a viable market player. Internet services, like local broadcast signals, are inherently localized in nature. Indeed, it would be highly inefficient to use broadband capacity available on a satellite system covering the United States to broadcast data intended only for a single subscriber.

Northpoint's technology, however, is ideally suited for the delivery of high-speed Internet services, broadband data offerings, and other innovative services completely distinct from typical DBS or satellite services. In addition to offering local television signals, Northpoint's technology can provide communities with offerings utilizing bulk downloads of data and ultra high-speed, local wireless Internet services. Not only will this offer communities a gateway to

(...Continued)

Act of 1992, Direct Broadcast Satellite Service Obligations Comments Sought in DBS Public Interest Rulemaking, MM Dkt. No. 93-25, Public Notice, 12 FCC Rcd 2251 (1997).

the vast resources of the Internet, Northpoint's special transmission characteristics will allow new community-based services that are not possible with low speed wireline Internet service. For example, schools will be able to offer interactive distance learning, parents and caregivers will be able to monitor children and other loved ones in day care or hospitals. While important to all communities, this benefit is particularly valuable in rural areas.¹⁴

Northpoint's ability to provide high-speed data services is attributable to the very broadband nature of the system and the city-by-city frequency reuse. The technology is easily capable of burst transmission rates of 1.5 megabits per second or more. In conjunction with a more conventional wireline telephone or wireless return channel – or even using the technology in a two-way configuration – the system is uniquely suited for asymmetric data applications like the Internet, where far more data is sent to the user than data sent from the user. Thus, using Northpoint's system, DBS operators will, like their cable competitors, be capable of offering adjunct broadband data services in conjunction with conventional video programming.

Ultimately, the ramifications of Northpoint's technology will extend far beyond the immediate commercial application in the DBS spectrum. Because the system is a generic means for sharing between terrestrial fixed services and geostationary orbit satellites, this technology will open the door to reharvesting vast blocks of spectrum for national security, public safety, educational, medical, and other uses. Using the technology, new broadband networks can be deployed in bands previously restricted to geostationary satellite space-to-earth links. And,

¹⁴ Notably, because larger exclusion zones can be engineered in rural areas, which provides a correspondingly greater reliable service area, Northpoint's system can economically serve vast rural markets on a cost-effective basis. In other words, Northpoint Technology does not suffer the cost penalties associated with many new radio services in rural areas where the cost of infrastructure cannot be justified in low population density areas.

conversely, if Northpoint technology is used in terrestrial allocations, geostationary satellite use can be enabled in previously terrestrial-only bands. In fact, Northpoint additionally makes possible a new paradigm of services: team broadcasting from both terrestrial and satellite sources. For example, this technology could be utilized to provide Enhanced Radio Broadcasting, where listeners will be able to customize their listening experience by accessing deeper layers of programming at the touch of a button. In this way a listener could hear the second track of a music CD, or go to the full text of a speech, even after the announcer had moved on to another selection or news story.

IV. NORTHPOINT'S EXPERIMENTAL TRIALS DEMONSTRATE THE FEASIBILITY OF NON-INTERFERING TERRESTRIAL USE OF THE 12.2 - 12.7 GHz BAND

As indicated above, Northpoint envisions a terrestrially-originated supplement to DBS that relies on the relatively uniform orientation of existing DBS receivers. Conceptually, Northpoint uses a directional antenna radiating southerly (*i.e.*, into the back of the DBS subscriber dish) to communicate with a supplemental, directional antenna (oriented generally northerly) that connects with the existing DBS receiver unit. Because the Northpoint signal comes into the "back" of the DBS subscriber dish, a region where spurious signal rejection is very good, the Northpoint signal will not interfere with the reception of existing DBS programming. As discussed further below, Northpoint's real world experimental trials demonstrated that, even in near-worst case atmospheric conditions, the "exclusion area" surrounding a terrestrial transmitter is very small (1/4 mi.) compared to the "reliable service area" served by the transmitter. Thus, using sound engineering practices, Northpoint's

technology can be deployed effectively, efficiently, and without causing harmful interference to existing or future DBS subscribers or other current users of the band.

A. Deployment of Northpoint's Technology Will Not Cause Harmful Interference to Existing or Future DBS Operations

The primary goal of Northpoint's experimental authorization was to verify that terrestrial transmitters could be deployed using directional antennas, in conjunction with known satellite positions, to provide terrestrial signals to the DBS receivers. It also sought to determine whether careful engineering could decrease the previously determined Carrier-to-Noise plus Interference ($C/(N+I)$) ratio needed to protect DBS operations from interference. This $C/(N+I)$ ratio was developed by DirecTV and detailed in a report submitted to the FCC.¹⁵ The DirecTV report analyzed the impact of *indiscriminately positioned* (with respect to DBS users), relatively high power, two-way terrestrial microwave links in the DBS band. Northpoint sought to supplement this record with precisely engineered positioning of its terrestrial transmitters to determine its effect on $C/(N+I)$ ratios. Once the appropriate $C/(N+I)$ ratio could be established, a known exclusion zone with a corresponding reliable service area for a particular transmit EIRP and direction could be defined.

The exclusion zone is an area where signals from the Northpoint terrestrial transmitter would cause harmful interference to DBS reception. The reliable service area of the Northpoint terrestrial transmitter is defined as an area where signals from the terrestrial transmitter will be sufficiently strong to be received without interference. Northpoint's system relies upon the use

¹⁵ On April 11, 1994, DirecTV submitted a report to the FCC entitled "Terrestrial Interference in the DBS Downlink Band".

of the known look angle and orientation of DBS receivers in an area to create, in effect, a land-based satellite orbital slot. By using directional antennas and orienting the transmitters in a southerly direction, Northpoint technology was developed to minimize the exclusion area for a given reliable service area.

Northpoint's complete experiment results were reported to the Commission on January 8, 1998. These results, as documented in this report, indicate that the basic concept of the Northpoint technology, transmitting terrestrially on co-channel satellite frequencies, is viable as long as the terrestrial station is properly engineered. This first stage of testing demonstrated that, as long as a $C/(N+I)$ ratio of at least 4.8 dB was maintained between the satellite signal and the terrestrial signal (with the terrestrial signal being the weaker signal), there would be no perceptible interference into the DirecTV or EchoStar DBS systems. This ratio is substantially lower than the 10 dB ratio demonstrated by the DirecTV report. Moreover, however this ratio is achieved, whether by antenna receive characteristics, power level adjustment, transmit antenna directionality, or a combination of all of these, the end result is the same—harmonious co-existence of co-channel terrestrial and satellite signals.

Importantly, Northpoint Technology can co-exist with DBS systems independent of atmospheric conditions. Typically, DBS systems incorporate a significant rain fade margin to ensure that, as weather conditions change and propagation losses increase, a usable received signal level is still maintained at the end-user dish. Thus, while a DBS signal on a clear day may be significantly higher than needed to achieve reliable communications, the margin may decrease substantially if rain conditions affect the Earth-to-space uplink or the space-to-Earth downlink.

However, by monitoring the received signal level of the DBS transmission on earth,¹⁶ Northpoint can adjust its transmitter output power in real time to ensure that a constant $C/(N+I)$ ratio is maintained for the DBS system. Thus, if there is 3 dB of fade affecting the DBS link in a given area, Northpoint can decrease the power of its transmission by 3 dB to avoid harmful interference.

With the $C/(N+I)$ ratio established, the experimental report details the determination that, in a rural environment with no multipath issues, a service area in excess of 10 miles (16 km) could be achieved while maintaining a minimal exclusion zone of less than $\frac{1}{4}$ mile (1320 ft/402 m). Notably, due to the limited transmit antenna height (52') used in the testing, the reliable service area was measured at 10 miles despite approximately 19 dB of ground attenuation. In areas where higher antenna elevations can be used, the reliable service area could be much larger. Additionally, since the exclusion zone is relatively insensitive to variations in antenna height, use of higher elevation antennas could decrease the effective exclusion zone, because much of the exclusion zone associated with the transmitter may be in the air above roof level. Indeed, a terrestrial licensee may be able to operate with an exclusion zone that covers a few DBS subscribers by developing individualized accommodations, as UHF TV broadcasters currently do to mitigate intermodulation problems close to their transmitters.

¹⁶ Obviously, depending upon the environmental conditions of the local area, a network of monitoring stations may be required. Because existing DBS end-user antennas can be easily modified to serve as received signal level monitors, the costs of local monitoring are relatively low.

While Northpoint continues to test with its experimental license,¹⁷ the feasibility of its technology has been demonstrated. Since the system can be used to transmit terrestrially in the DBS band without causing interference to DBS subscribers, locally transmitted signals can be integrated into existing DBS subscriber equipment, with only minor modifications, so that local television stations, rather than distant signals, can be viewed. Moreover, the Northpoint system can utilize the same modulation techniques as existing DBS transmissions. In this manner, the subscriber antenna (which can, in cases, be a simple, inexpensive mylar device), can be connected directly to the subscriber's DBS receiver unit. Thus, using Northpoint local signal distribution technology would preserve the estimated \$3 billion dollar equipment investment by the 8 million American DBS subscribers and allow a minimal marginal cost for adding local signals. Implementing this system can thus solve several problems for the DBS operators and eliminates their biggest barrier to being truly competitive to cable television. Northpoint's solution is the only potential local signal distribution mechanism that at once operates in the same band and holds the promise of carrying all local broadcast signals.

As a final matter, Northpoint observes that, at WRC-97, non-geostationary fixed satellite service ("non-GSO FSS") use of certain bands, including the 12.2-12.7 GHz band, was permitted subject to two sets of provisional power flux density ("pfd") limits intended to protect existing terrestrial and geostationary broadcast satellite service ("GSO-BSS") operations. Obviously, because the United States has deployed both terrestrial and DBS systems in the 12.2-12.7 GHz

¹⁷ Northpoint has applied for a modification to its experimental license to permit it to engage in further testing in the Austin, Texas market, hopefully in conjunction with one or more DBS licensees. These tests, among other things, will consider the effects of urban environments, multipath, and optimization of the terrestrial transmitter placement.

band, any non-GSO satellite system would be limited by the more stringent of the provisional pfd limits adopted at WRC-97. Specifically, under the provisional pfd limits adopted at WRC-97, the equivalent (combined) pfd for a non-GSO FSS system may not exceed, for an antenna diameter of 45 cm, -174.3 dB(W/m²/4 kHz) 99.7 percent of the time and in no case more than -165.3 dB(W/m²/4 kHz). These limits are, however, provisional and the resolution adopted at WRC-97 was intended “to ensure that the interference caused by [non-GSO] systems . . . is maintained within *negligible* levels.”¹⁸ At these pfd levels, Northpoint believes non-GSO systems would interfere with deployment of its technology. Indeed, some dispute has even arisen with respect to whether these limits would even protect conventional DBS operations. Northpoint therefore urges the Commission to consider carefully the respective benefits to domestic consumers of its technology versus allowing non-GSO systems in the 12.2-12.7 GHz band at these provisional pfd limits.

B. Deployment of Northpoint’s Technology Will Not Cause Harmful Interference To Incumbent Microwave Operations

Prior to the establishment of an allocation by the Commission in the 12.2 - 12.7 GHz band for DBS in 1983, limited fixed microwave services were authorized in this band. These operators were required to relocate from the 12.2 - 12.7 GHz band or be relegated to secondary, non-interference status with respect to DBS operations. Several hundred of these licensees continue to operate fixed terrestrial microwave stations throughout the United States.

¹⁸ Res. COM5-19 (WRC-97) (emphasis added).